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ABSTRACT

As traditional medical school curricula began to be criticized in the 1950s, various alternatives were proposed, including the organ-system based curriculum (organized around the organ systems of the body) and the problem-based curriculum (organized around clinical problems). From an open systems perspective, any such medical school curriculum change raises questions about the innovations's potential effect on all three sectors of the institution: education, service (patient care), and research. Analysis of the planning process involved in curriculum change thus includes three dimensions: centrality (priority within a school's total set of objectives), locus (location of the institutional decision-making apparatus), and inclusivity (implications for other noncurricular activities). Two case studies of the efforts of one well-established and one recently established medical school to institute organ-system-based and problem-based curriculum change reveal quite different experiences. Results of the studies--based on interviews, analysis of written materials, and observation--confirm three general hypotheses: the more central an innovation to the institution's goals, the more likely it is to be maintained; the institutional locus of planning that maintains the innovation will parallel the locus of power; the more inclusive the innovation, the more likely it is to be maintained. (JBM)

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Planned Curriculum Change: A Comparative Case Study

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PLANNED CURRICULAR CHANGE: A COMPARATIVE CASE STUDY

by

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Introduction

This study examines the relationship between the viability of a curriculum innovation and certain aspects of the planning process. It is part of a larger investigation that relates the outcome of curriculum innovations in medical schools to (a) specific organizational characteristics of the innovating schools; (b) the change strategy; and (c) the particular characteristics of the innovations. This report presents findings on only one aspect of these sets of variables: it examines the portion of the change strategy which can be termed the planning process.

The Curriculum Innovation

The spectrum of innovations that a school introduces often grows out of a common set of perceptions about the problems that exist in a 'traditional' curriculum. The traditional curriculum of American medical schools was adopted nationwide following the publication of the Flexner Report in 1910. The curriculum was modeled on that instituted at Johns Hopkins in the 1890s and, incidentally, departed in a number of ways from Flexner's own recommendations (cf. Jonas, 1978). The main features of the Hopkinsonian curriculum were a) a graded, cumulative instructional strategy; b) intense and virtually exclusive attention to the so-called "basic medical sciences" (anatomy, physiology, etc.) during the initial two years; and c) similarly intense and exclusive attention to clinical medicine (medicine, surgery, pediatrics, etc.) in the hospital setting during the final two years.

Another result of the reform in medical education early in the twentieth century was the establishment of a full-time teaching faculty within medical schools. This innovation occurred first in the basic sciences where separate departments were organized and assigned responsibility for teaching and research. Each department had main responsibility for a part of the pre-clinical curriculum, which developed into a set of intensive and relatively independent courses. Thus, instruction became department based and faculty were hired to staff these departments as specialists in a particular field and not generalists in medicine.

The traditional curriculum persisted without serious questioning until the early 1950s. At that time Western Reserve University (now Case Western Reserve) instituted a major revision in the educational approach. The Western Reserve departure led to a gradually increasing concern with curricular issues among many medical schools in the 1960s.

A number of factors were responsible for the awakening of the long-dormant interest in medical curricula. The explosion of scientific knowledge had led to an overcrowding of the basic science years which many considered untenable (Lippard, 1972). This was exacerbated by the frequent content repetition which resulted from the lack of coordination among departments. Over and above these criticisms was the heightened perception that the basic sciences as taught in the traditional medical school had little relevance to clinical practice (Lippard, 1972). Studies of retention of basic science knowledge over the course of medical school indicated that a large amount of content was forgotten even before graduation (Kennedy, et al., 1981). Finally, the wisdom of separating clinical and preclinical education was called into question, frequently with reference to the resulting lack of focus on necessary social and interpersonal skills in physician education.

Curriculum revisions that were made in the basic sciences in an attempt to correct these problems took several forms. The two curriculum models that will be addressed here are the organ-system based curriculum and the problem-based curriculum. Both attempt to redefine the basic science content necessary to practice medicine and to teach content in a way that is applied rather than theoretical. They are not mutually exclusive, but rather can be, and sometimes are, present at the same institution.

Organ-System Based Curriculum: In this model, the organizing elements are the organ systems of the body (e.g., gastrointestinal, cardiovascular). Teaching is interdisciplinary, with faculty from each (or most) of the basic sciences contributing to each organ system. The approach is innovative in that it attempts to tie together all concepts relevant to a particular system and emphasizes how the basic sciences are related to each other in the functioning of the system. The model requires that basic science faculty work together outside of a departmental framework and also become more familiar with content outside their usual area of expertise.

The extent of application of this curriculum model varies. Some schools limit this approach to a portion of the curriculum or integrate only a few of the basic sciences (e.g., physiology and biochemistry or anatomy and pathology). Students may be taught using only the lecture format, or small group teaching and independent study may be included.

Problem-Based Curriculum: In this model, the content is integrated around clinical problems. The problems chosen may be presenting symptoms (e.g., headache), physical findings (e.g., hypertension), or community health issues (e.g., air pollution). In its most refined form, this approach requires students to investigate such problems without any previous basic science coursework. The series of problems is designed so that all basic science

concepts thought to be necessary for practice are covered. Instruction is usually in a small group problem-solving format, with the faculty member serving as a facilitator/tutor, not as an expert in the traditional sense. The problem-based format may be employed in conjunction with an organ-system based arrangement of content. Problems are then developed which are designed to introduce basic sciences as they relate to a particular organ system.

The problem-based curriculum requires the cooperation of basic scientists and clinicians in both planning and implementation. For this reason, and also because the model requires a very student centered approach, this innovation usually implies more change than is necessary in an organ system model. The problem-based curriculum is currently used in a small number of medical schools in the United States and Canada, and is still being introduced into medical schools especially in developing countries.

Conceptual Framework

The conceptual framework for this study is provided by the adaptation of Katz and Kahn's (1978) open systems theory to the arena of medical education within the context of the academic health center. Open systems theory's analysis of process in terms of functional subsystems and roles lends itself well to the description of medical schools which are frequently plagued by multiple and overlapping (sometimes conflicting) functions, roles and relations with the environment (Weisbord, 1975). For the purposes of this paper, it is important to recognize that most medical schools are composed of three sectors: education, service (patient care) and research. Each of these sectors includes a variety of functional subsystems. Among these are the production subsystem whose function is to accomplish a specific task, and the maintenance subsystem, whose function is to mediate between task demands and the need to keep the organizational structure in operation (Katz and Kahn, 1978).

Dichotomizing production and maintenance inputs emphasizes that the retention of system integrity is problematic, continually challenged by forces acting to disrupt the crucial interaction of people which constitutes a social organization's basic structure. Production and maintenance functions may also become incompatible.

Added to this potential source of conflict between production and maintetance subsystems is the possibility of conflicts among the sectors of a medical center. While education, research and service are usually in a state of (somewhat uneasy) compatibility in traditional medical schools, disturbances within one of the sectors may provoke conflict (e.g., over resources, goals) with other ones.

The curricular innovation which is the central concern of this paper (i.e., the introduction of an integrated curriculum in the basic sciences) may be regarded as a change in the "production" activity of the educational sector of the medical school. The innovation requires different patterns of interaction, different event structures, different functional activities; it is in fact a major perturbation in the steady state of the educational sector.

From the open systems perspective, the new curriculum might be seen as a stone tossed into steady-state waters. Its effect causes ripples throughout the system. Its effects are not contained within the production subsystem of the educational sector. The maintenance subsystem is also affected; new tasks are imposed on the role system, and new expectations are generated about appropriate behaviors. The maintenance function of mediating between those new tasks and the personal needs and inclinations of the faculty becomes different from what it had been before the perturbation. At the same time, the dynamic of the maintenance subsystem itself is triggered in that it can be

expected, at least initially, to counter the disturbance arising from the innovation, to the end of maintaining the previous steady state.

Ripple effects of the curricular change extend to the other subsystems within the educational sector: to boundary subsystems (e.g., student selection, placement of graduates in residencies, obtaining financial and political support from external sources), to adaptive subsystems (e.g., processes for monitoring and evaluating system performance, planning), and to managerial subsystems (e.g., managing potential conflict between the production and maintenance subsystems, matching requirements arising from the innovation to environmental resources).

The effects of the educational innovation may also be carried beyond the educational sector to both patient care (e.g., clinical training and the role of residents, emphasis on primary care) and research (e.g., redefinition of the basis of medical knowledge, reprioritization of research goals along interdisciplinary lines).

Regarding the consequences of the curriculum change as ripples from an initial disturbance actually understates the structural dynamics involved. It is perhaps closer to reality to view the ripples as bouncing off an enclosing border and running into each other over the entire surface. The wave pattern quickly becomes complex. Nonetheless, by attending to the relative strengths of the various subsystems within the sector, the main currents which contribute to the innovation's success or failure can be charted.

Major Dimensions

Three dimensions are employed in the analysis of the planning process: centrality, locus, and inclusivity. The three dimensions were developed along with others during the design phase of the project as part of a provisional

theoretical framework. The dimension of centrality was suggested by the work of Dalin and McLaughlin (1975); that of inclusivity, by Hage and Aiken (1970). The locus dimension emerged from general considerations of the nature of organizational goals and goal-setting. Data obtained during the field work phase of the study were tested against the provisional framework. The three dimensions reported here are the ones that demonstrated substantial explanatory power for the data, insofar as innovation planning processes are concerned. It is anticipated that the study's conceptual framework will be elaborated with other dimensions as (a) the data base for the planning phase is extended, and (b) other phases of the innovation process are examined. At the present time, though, the explanatory framework consists of the following three dimensions.

Centrality refers to the position of the curricular innovation within the total set of objectives a medical school is pursuing. The dimension is an attempt to describe the importance of the innovation to the school in terms of its contribution to a school's fundamental and guiding purposes.

Centrality is assessed here by constructing a means-ends hierarchy and determining the position of the innovation within it. Every objective in the hierarchy is viewed not only as an end in itself, but as the means for achieving a further, "higher", objective (excepting of course the organization's final objectives, the production of its intended outputs). Objectives toward the top of such a hierarchy are more "central" than those toward the bottom. An innovation's centrality depends on its position within the hierarchy; when it is higher it is more central.

In an academic medical center three major hierarchies of objectives are present, corresponding to the three substantive sectors of education, research,

and patient care. In addition, there is another cross-cutting set of administrative objectives intended to keep the substantive sectors together as one more-or-less integrated organization. Assessing centrality thus involves determining the position of the innovation within the hierarchy of objectives for each sector and within the total (administrative) hierarchy. The general hypothesis concerning centrality is that the higher an innovation's centrality within each sector and within the total school, the greater the likelihood of the innovation's survival.

The second dimension explores the locus of the planning process within the school's decision-making structure(s). It relates the planning process to the formal influence structure(s) within the medical school, where organizational influence is defined as the ability to make binding decisions. To some degree, the identification of the locus of the planning process reflects the extent to which the change in the educational sector's production subsystem (i.e., the curriculum innovation) has enough power to have an impact on the maintenance subsystem. The locus of the planning process is assessed by identifying the decision-making apparatus at the institution and then locating the planning effort within that apparatus. The general hypothesis is that the closer the planning process is to the site where decisions are made, the higher the likelihood of the innovation's survival.

The third dimension is termed inclusivity. It reflects the breadth of the perspective used by planners. The dimension was selected because a major curriculum revision may have effects well beyond the instructional effort. Within the educational sector, a curriculum change may have implications for other non-curricular activities. For example, the new curriculum may place very different expectations on faculty in terms of both time commitments and

type of teaching. Depending on the inclusivity of the planning process, it may or may not attempt to change recruitment and promotions policies so that they better reflect the requirements of the new curriculum. Other areas, such as student admissions policies, might also be included in the planning process. Beyond the educational sector, there is potential for the patient care and research sectors to become involved in the change. In an inclusive planning process, this broad involvement is actively sought to ensure compatibility across the sectors (e.g. a redirection of patient care emphasis from tertiary to primary care or the establishment of interdisciplinary research projects). The general hypothesis is that the greater the number of functional subsystems explicitly considered in the planning process, the greater the likelihood of the innovation's survival.

Methodology

The research goal intentionally places a strong emphasis upon process. This is in contrast to much organization and innovation research, which tends to view process as determined by organization instead of as a factor in determining the interplay between organization and innovation. Since the focus of this research is on contributing to the developing of practice-oriented models of change, which can be applied in order to bring about planned change, the process component is of primary importance. Therefore, a strong historical research component was included in the research design.

Two medical schools were chosen as case studies. The cases were selected because they differed in innovation outcome and also in a variety of other respects. Case Study A, an 85-year-old institution, introduced and then abandoned an organ-system based curriculum. Case Study B was a relatively new school which successfully introduced and maintained an organ-system and

problem-based curriculum. While the number of medical schools in North America which have experimented with these innovative curricula is too small to allow a statistically supported identification of "typical" clusters of characteristics affecting innovation outcome there is some evidence that our two cases are fairly typical - the well-established, change-resistent medical school versus the new, innovative medical school. Our project's purpose was to include, but also look beyond, the role tradition plays in the schools' decisions in order to identify factors which have widespread applicability.

Fieldwork was conducted at the case study schools. It included a variety of methods for accessing information on the planning process. These included:

a) Interviews: In each school intensive interviews were conducted with:
   1) administrators of the educational program
   2) leaders of the planning process (e.g. curriculum committee chairmen)
   3) participants in the planning process (e.g. curriculum committee members; instructional planning groups)
   4) other faculty members present at the time of change, but not direct participants in the planning
   5) faculty members who joined the faculty after the initial planning process was completed
   6) members of committees in non-educational areas (e.g., promotions, admissions).

b) Analysis of written materials: A wide variety of written materials were reviewed to determine the participation of particular individuals in the planning process, topics discussed during planning, leadership styles, and methods of decision-making. The materials included:

1) minutes of planning committees
2) reports of advisory groups
3) journal articles
4) drafts of instructional units
5) letter communications
6) newspaper articles
7) organization charts

c) Observation: Current planning processes were observed to determine changes over time as well as mechanisms for revising existing curricula and ensuring consistency with educational goals. Observations were limited to meetings of curriculum/education planning committees.

Prior to the fieldwork, a detailed schedule of information to be gathered at each case study institution was developed. On the basis of this schedule, minimally structured instruments for interviews and analysis of written materials were designed. However, as much flexibility as possible was built into the research design. This reflects the conviction that: a) it would be premature at this point to predefine rigorously the areas of investigation; b) the schools are so different that too great a uniformity of fieldwork experience might well lead to the omission of important factors present in one school but not in another; and c) in this stage of theory development, it is essential that the fieldwork be dynamic with interviews, analysis of written materials and observation informing each other.

Results

Innovation Outcomes

Case Study A exemplifies an organ-system curricular innovation which has not been maintained. Prior to 1970, this long-established College of Medicine was built on a traditional course of study (two years of basic medical sciences followed by two years of clinical training). In 1971, the College of Medicine was reorganized to create separate one-year basic science and three-year clinical schools. Each school developed a new curriculum at the time of the reorganization

The nine-month basic science curriculum initiated in the Fall of 1971 covered Anatomy, Behavioral Science, Biochemistry, Microbiology, and Physiology Content was integrated into organ-system themes (e.g., central nervous system, gastrointestinal). However, from the very outset of the new curriculum, there was some difficulty including all of the basic science content which the faculty considered necessary within the organ-system themes. Some information was regarded as pre-requisite to the themes and other information did not seem to fit. As a result provision was made for the separate presentation of some basic science content. For example, 22% of the lecture hours in Anatomy, 4% of the lecture hours in Physiology, and 85% of the lecture hours in Microbiology were not integrated into themes. Lecture was the major instructional format and laboratories were offered in Gross Anatomy, Histology and Microbiology.

By 1980, all integrated themes had disappeared from the curriculum and instruction was organized into departmentally-based courses. In 1982 the College of Medicine was again reorganized into a single unit with approximately two years of basic science and two years of clinical instruction.

Case Study B is an example of a well-maintained integrated curriculum. At this school basic sciences are studied within the context of problems which are usually, but not inclusively, developed with reference to specific organ systems. Thus, the curriculum at Case Study B is both organ-system-based and problem-based.

The three year curriculum implemented in the Fall of 1969 was organized into four phases in each of which the learning centered around problems. The first phase, lasting approximately three months, introduced the student to the medical community, presented techniques of self-learning, gave an overview of human structure and function and provided some initial instruction in clinical skills. Phase II lasted about two months and introduced students to "the ways in which the bodily dynamic equilibrium may respond to environmental alterations: at the cell through whole person levels." Phase III lasted about nine months and covered structure and function in health and disease. The Phase was divided into units based on organ systems. Phase IV consisted of clinical clerkships.

The emphasis at Case B is on independent learning. Instruction takes place mainly in a small-group format under the guidance of "non-expert" tutors, faculty members whose areas of expertise are not directly pertinent to the problem unit under discussion. Besides involving faculty members as tutors, the program identifies, "resource persons" for each unit. These are content experts who make themselves available to assist students in their problem-solving activities.

Since its inception in 1969, the curriculum at Case Study B has undergone some changes, many of which seem to relate to the increasing size of the institution. However the basic principle of the curriculum, problem-based learning in a small group format, remains unchanged.

Centrality

At the College of Medicine in Case Study A, the original change mandated was an increase in student enrollment. This directive came from an external agency (the state Board of Higher Education) and reflected the growing sentiment in the 1960's that we were headed toward a physician shortage and increasing regional discrepancies in health care. The Board of Higher Education's directive to increase enrollment received enthusiastic support from upper level College of Medicine administrators.

Tied to the goal of producing more physicians were external pressures to regionalize medical education by providing opportunities for clinical instruction at hospitals outside the Medical Center and at selected sites throughout the state. In order to provide for such a change, the formal separation of the basic science and clinical components of medical education was planned. This would allow one central basic science school to feed into a number of regional clinical schools.

The decision was made by a College committee that instruction in the newly-created basic science school was to be limited to one year. It was only after these decisions had been made that faculty planners began to address the question of the curriculum of the basic science school. They were confronted in their deliberations with a major issue: For a number of reasons having little or nothing to do with the content and teaching methods in basic medical sciences, it had become necessary to change the curriculum in such a way that content could be delivered in one year instead of two. The result of these deliberations was an integrated, organ-system-based curriculum, where content overlap and repetition would be kept to a minimum and efficient utilization of available time would be emphasized. The <u>educational</u> value of the new

experience received less consideration. Thus, educational innovation was the result of a logistical necessity that grew out of the original change whose goal was to produce more physicians.

In case Study School B, the original small group of educational planners recruited to organize the new school shared a conviction that the traditional system of medical education was inadequate. They questioned the most fundamental aspects of the medical education curriculum including the appropriateness of the traditional basic medical science content and even the usefulness of trying to define a core basic science content as the basis for physician training.

This group of planners--all of them physicians--entered the planning process with no formal training in education per se but with strong impressions of what needed improvement in medical education. They spent three years planning the establishment of a new medical school with a consistent main focus on improving the educational process through the creation of a new curriculum. While they did not neglect other aspects of the school, they regarded these as secondary to, and sometimes as the means of achieving, the central goal of improving medical education.

Locus of Curriculum Planning

When School A established its separate basic science school, it transferred most of the governance structure of traditional medical schools to the new institution. This meant that a great deal of power was once again concentrated in the individual departments and their chairpersons.

Overall responsibility for the planning of the new basic science curriculum at School A was located in the Committee on Instruction. This committee was composed of representatives from each of the basic science departments. The Committee on Instruction did not have final jurisdiction over educational policy, but was required to obtain approval for its actions from the School's Executive Committee,

composed of department chairpersons and elected faculty representatives from each department. The structure also included instructional theme groups who were engaged in planning the individual organ-system units. The Executive Committee also had the power to appoint or approve the chairpersons of the theme groups. While the theme chairperson could request faculty for the theme instruction, the final decisions on the assignment of faculty to teach within a theme rested with the individual department chairs. Thus, both in the planning and the actual instruction of the new curriculum the real control remained with that which was supposed to be in the process of being integrated -- i.e., the basic sciences as independent and powerful departmental units. Not only was the planning process not parallel to the school's decision-making structure, but the basis for its work, i.e., the restructuring (integration) of knowledge, was in direct conflict with a decision-making structure based on traditional, isolated knowledge areas.

In marked contrast to School A, School B has explicitly rejected from the outset the notion of departmental representation in decision-making bodies. Basic to School B's decision structure is the principle of matrix management. This system places major program areas (e.g., education, research) on one side of the matrix and departments on the other side, and, in so doing, explicitly recognizes the need of the program areas to cut across departmental lines to achieve their goals.

The central educational decision-making body at School B is the Education Committee which develops educational policy and previews and reviews instructional units. The Education Committee was originally composed of four members appointed by the dean. Each of these individuals became the chairperson of one of the subcommittees that developed implementation strategies for the four curricular phases. After approximately one year, more faculty were incorporated into the Education Committee, but representation was never by department. Departmental

input in curriculum planning (an on-going function at School B) is solicited through the appointment of "discipline coordinators" whose function is to review the curriculum for the purpose of identifying possible gaps or redundancies. Decisions on their findings, however, rest solely with the Education Committee. Thus, at School B educational management was defined as a committee not a departmental function and the planning committee therefore had the power to make decisions and see them through to their implementation.

Inclusivity of the Planning Process

The Committee on Instruction at School A limited its deliberations to those activities which were most directly and traditionally associated with the educational function of the institution. In addition, it emphasized the mechanistic aspects of curriculum planning rather than addressing broader, more basic curriculum issues. Thus, it devoted considerably more time to the organization of content than to its definition. It dealt with such problems as instructional hours and instructional formats. The Committee on Instruction did not attempt to extend its deliberations to the other sectors of research and service or seek ways to make the structuring of these sectors more compatible with new educational directions. Indeed, it did not have the power to do to. Even areas embedded in the educational sector or on its boundary were left untouched. Thus, student admission, student appraisal, faculty promotions remained the responsibility of separate School and College Committees.

In School B, the Education Committee deliberations about the educational program included a wide range of functional subsystems within their organization as well as the areas of research and patient care. As a result of initiatives of the early Education Committee, a variety of structures and policies were established which are still guiding forces. High on the list of these initiatives was the establishment of the matrix organization, which deliberately provided the institution with an organizational structure more consistant with the educational

goals than a departmental organization. The Committee also recognized that the integrated approach to education would have to be supported by a formalized integrated perspective in other sectors, so that the matrix organization was extended to other program areas, most notably, and successfully, to research. In this way, the research power base which traditional departments have was weakened.

Education Committee initiatives extended also to faculty promotions policies (strong emphasis on educational contributions) and recruitment policies which placed acceptance of the innovative educational system high on the list of criteria.

The Committee was careful not only to provide a structure for the maintenance of the educational innovation, but also to attempt to make all parts of the educational function compatible with each other. E.g., it considered the issue of student admissions standards intensively. Resulting policies reflect the non-traditional perspective on the role of the basic sciences in that a relatively high proportion of their student slots were allotted to applicants with non-science backgrounds. A lengthy discussion on student evaluation resulted in a decision compatible with the emphasis on self-directed learning and the lack of a "core curriculum", namely, that there would be no summative, cognitive testing. Both admissions and evaluation policies remain within the domain of the Education Committee.

Conclusions and Implications

The comparative analysis of data from the two case study medical schools indicate support for the general hypotheses stated previously:

A) Where the innovation was central to the goals of the institution (School B) it was maintained. In School A, where the curriculum innovation was secondary to the main institutional goals, the innovation was not maintained. The centrality of the innovation was higher in the institution in which it was maintained.

B) In School B, considerable power was placed in the hands of the planning

groups. In contrast, School A decisions made by planners were often undermined by powerful groups contained within traditional structures. The locus of planning in the institution which maintained the innovation paralleled the locus of power.

C) School B planners were aware from the outset of the need to involve subsystems outside of the educational program in the curriculum innovation to ensure consistency with the new approach. School A, on the other hand, insituted very few changes outside the educational program. The inclusivity of the well-maintained innovation was considerably greater than that of the poorly maintained innovation.

Two comments must be made about the findings thus far. The first is that the relationship between the three dimensions and innovation success are not independent of each other. For example, it seems likely that where the innovation is central to the institution's goals, the need to be inclusive will be better perceived and accepted. Certainly, the Committee on Instruction at School A had neither the mandate nor the power to reach out to non-curricular areas and attempt to make changes. The educational change, because of its non-central position, was guided by the needs of other sectors and subsystems in contrast to the situation at School B. Inclusivity may, in turn, frequently be associated with changes in the decision-making structure, which may make that structure more compatible with the planning process. A very good case in point is the decision in School B to impose a matrix management organization on all sectors of the institution. A decision-making structure in which the traditional power of the departments was sufficiently weakened to facilitate an integrated curriculum could probably not have been obtained if the research sector had not been included in its deliberations on management systems.

Other possible interdependencies among dimensions can be postulated. What is important is the recognition that the factors which promote successful change

must be seen in relation to each other, and not as simply additive in their effects.

The second comment involves constraints on the change process. Clearly, School B began its innovation in a very favorable position: it was new and, therefore, had no traditional structures to confront. Its newness allowed planners to ensure faculty acceptance of the curriculum through very selective recruitment. The institution was well funded, and planners were granted a good deal of time for the planning process. None of these positive elements was present at School A. It is, however, not useful to declare old, long-established medical schools incapable of change. The age or tradition of an institution is not an unmediated cause of innovation difficulties, but rather a circumstance within which certain structures and dynamics are more likely to be present than in new institutions. It is important to be aware of which of those structures and dynamics must be directly addressed in order to increase the likelihood that a change will really accomplish its goals. Thus, the identification of dimensions which impact on the innovation process should allow both new and established medical schools to address the specific aspects of their institution which impede change or its maintenance, and to work <u>within</u> their constraints to improve their change capacities.

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